

Functional properties of spray-dried white dragon fruit (*hylocereus undatus*) juice

Abstract

A study was conducted to produce white dragon fruit (WDF) powder by optimizing the spray drying conditions using maltodextrin DE 10 (MD) as a carrier. The process was performed using a pilot plant spray drier by manipulating its inlet temperature (150-170°C), outlet temperature (75-85°C) and MD concentration (15-30%) as the independent variables while process yield, moisture content, water activity, hygroscopicity and bulk density were analysed as responses. The optimum conditions were obtained at an inlet temperature of 150°C, outlet temperature of 75°C and 18% of MD concentration. MD concentration had the most significant ($p < 0.05$) effect on the powder properties. The WDF powder produced under optimum conditions was further investigated for its ability to support the growth of *Bifidobacterium longum* BB536 and *Lactobacillus casei* Shirota, and suppress the growth of *Salmonella choleraesuis* ATCC14028. Anaerobic growth of the bacteria at 37°C was determined every 6 h for 24 h in four MRS media containing glucose, MD, fructooligosaccharides (FOS) or WDF powder as the substrate. The results indicated that all the substrates significantly ($p < 0.05$) increased the growth of the probiotic bacteria; *B. longum* BB536 and *L. casei* Shirota and WDF powder gave the highest bacterial count. The number of the pathogenic bacteria, *S. choleraesuis* ATCC 14028 did not differ significantly ($p > 0.05$) from its initial count in media containing FOS and WDF powder while glucose and MD significantly ($p < 0.05$) increased its numbers. These results indicated that WDF powder enhanced the growth of probiotic bacteria more than FOS and inhibited the growth of pathogen and as such can be considered as a functional food ingredient for the functional food industry.